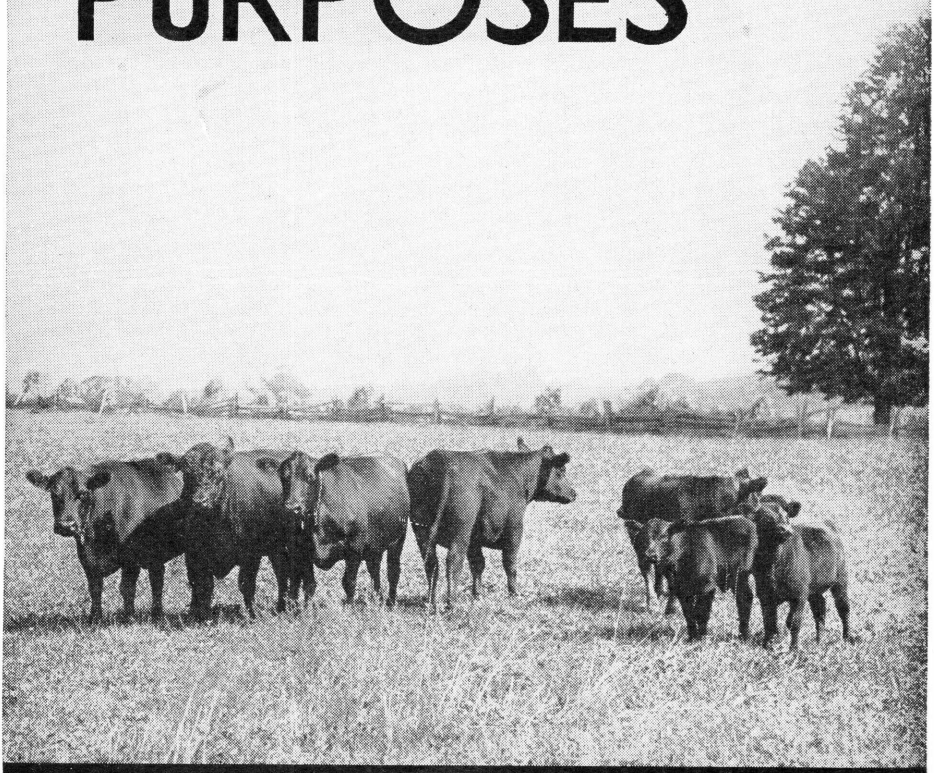
BEEF CATTLE for BREEDING PURPOSES



FARMERS' BULLETIN NO. 1916
U. S. DEPARTMENT OF AGRICULTURE

THE PRODUCTION OF BREEDING STOCK is a highly specialized phase of the beef-cattle enterprise and requires a thorough knowledge of breeding, feeding, and management to insure a reasonable degree of success.

The selection of individual animals within a breed for a breeding herd is of more importance than selecting the breed itself. Likewise, it is essential that the animals be given the necessary feeding, care, and management to insure their proper development.

Young growing stock should be fed liberally until they are at least 18 to 20 months old, preferably, in the interest of economy, on good-quality home-grown feeds.

The suggestions presented in this bulletin are offered as a guide in selecting, breeding, feeding, and managing beef calves, yearlings, and mature stock.

Washington, D. C.

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BEEF CATTLE FOR BREEDING PURPOSES

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Contents

INTRODUCTION

OF THE VARIOUS PHASES of the beef-cattle enterprise, that of producing breeding stock is perhaps the most highly specialized, for it demands considerable technical knowledge of beef-cattle breeding, feeding, and management to insure a reasonable degree of success. It is a phase of cattle production probably best suited to one who has made or is desirous of making the breeding of beef cattle a life work and who has either grown up on a beef-cattle farm or ranch or has had considerable experience with commercial phases of beef production.

The capital needed to procure breeding stock and equipment, and in some instances to employ someone fitted to manage the enterprise, is considerably more than would be needed in handling equal numbers of cattle for feeder or fat-cattle production. Generally it is desirable for the beginner to work into this phase of production gradually, particularly if he has had no previous experience in beef-cattle production.

SELECTION OF A BREED

The selection of a breed of beef cattle to raise is largely a matter of personal preference. There is no single breed best for all localities. A certain breed may have a slight advantage in some respects over others for certain areas, but when all factors are taken into consideration there is little difference in the merits of the breeds commonly raised.

The predominating breeds of beef cattle in the United States are the Hereford, Shorthorn, and Aberdeen Angus. The first two breeds include both horned and polled strains, whereas the last breed is strictly polled. These breeds are generally distributed throughout the United States, with the greatest concentration in the Corn Belt. The Hereford predominates in the range country. Although Aberdeen Angus and Shorthorn cattle are found in greatest numbers in the Corn Belt, they are raised extensively also in the Appalachian region. Among

[1] Resigned March 7, 1941.

other breeds of beef cattle the Brahman is rather numerous in the Gulf coast region, and the Galloway is found chiefly in the Corn Belt. Each breed has distinguishing characteristics,[2] not only in color marking, conformation, and type, but also in adaptation to certain environments.

Anyone contemplating the purchase of a foundation herd and the production of beef cattle for breeding purposes will find it highly advisable to consult unbiased persons in regard to the relative merits, current prices, and desirable blood lines of the respective breeds. An excellent way in which to obtain such knowledge is to visit beef-cattle breeding establishments and livestock shows. Representatives of the State agricultural colleges may be consulted regarding the selection of breeding cattle and other problems that may arise. The various breed associations employ field representatives who work for the interests of the respective breeds and lend assistance to breeders in the purchase, sale, and management of the cattle.

ESTABLISHMENT OF A BREEDING HERD

In establishing a herd of breeding cattle, the selection of a suitable bull to head the herd should be given first consideration. Important points are individuality, pedigree, age, freedom from disease, color markings, guaranty made by the owner with respect to health and breeding ability, and the cost of the bull delivered. Present trends call for a bull of medium size—one that will weigh, when mature and in good breeding condition, 1,700 to 2,000 pounds. From the standpoint of conformation, a low-set, deep, wide, smooth-bodied bull, compactly built and exhibiting considerable masculinity, is to be desired. The herd sire should also have a strong level back and rump, deep full thighs, relatively straight legs, a pliable hide of medium thickness, and considerable natural fleshing evenly distributed (fig. 1).

It is especially desirable to obtain a bull that has already established himself as a commendable sire. As such bulls are seldom available for sale, the usual procedure is to obtain a yearling or 2-year-old son of a bull that has already proved his breeding ability. A calf may be selected, but there is naturally more speculation in regard to the developmental outcome of a calf than of an older bull.

Although a breeder usually prefers a herd sire of good appearance, too much emphasis can easily be placed on looks alone at the expense of performance. A breeding bull should be selected primarily on the basis of the performance of his calves. Record-of-performance studies conducted by the United States Department of Agriculture and State experiment stations, to measure the breeding ability of cattle through the performance of their offspring, clearly show that the mere appearance of the animal is not a reliable guide to its performance. Figures 2 and 3 illustrate two full brothers decidedly different in appearance and just as variable in performance as in their appearance. The less attractive bull (fig. 3) sired calves that performed much more satisfactorily.

Although a bull of beef breeding is not so likely to have as nervous a temperament as a bull of the dairy breeds, it is advisable for attend-

[2] The characteristics of each beef breed are discussed in Farmers' Bulletin 1779, Beef-Cattle Breeds for Beef and for Beef and Milk.

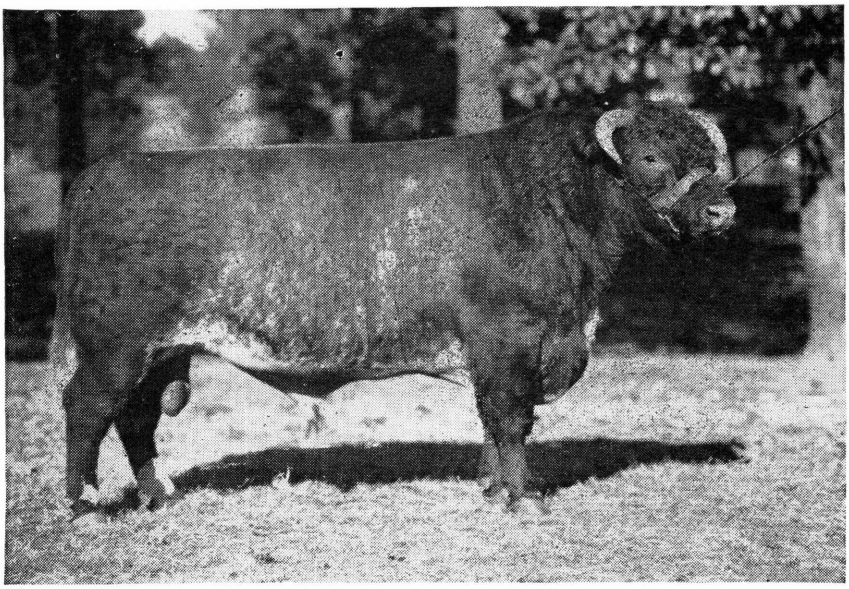

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FIGURE 1.—A desirable type of Shorthorn bull. The steer calves sired by this bull reached a weaning weight of 500 pounds and a slaughter weight of 900 pounds in significantly less time and produced higher quality carcasses than the steer calves sired by six other sires, and handled under the same record-of-performance procedure.

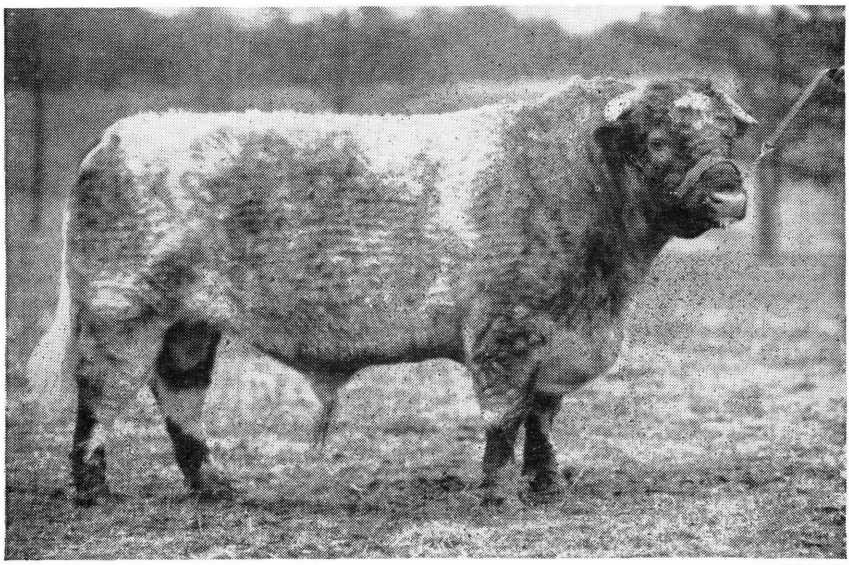

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FIGURE 2.—A very attractive bull. His calves were moderately efficient in their utilization of feed, but they tended to grow rather than fatten. On reaching a slaughter weight of approximately 950 pounds, they did not yield so desirable carcasses as the calves sired by his full brother (fig. 3).

ants to **avoid taking undue chances and not to enter an enclosure with the bull oftener than is necessary. If a bull should show signs of becoming vicious, put a ring in his nose and keep him in a safe bull pen.**

In the selection of cows and heifers, particular attention should be directed to type and uniformity. Medium-sized cows weighing 1,150 to 1,500 pounds when mature and in good breeding condition are generally to be preferred. Deep, wide-bodied, blocky females with strong backs, level rumps, deep full thighs, and short, relatively straight legs are considered desirable in type. Breeders are also desirous of selecting cows and heifers that are smooth and that possess an abundance of natural flesh evenly distributed. It is important to choose cows and heifers that give reasonable indication of ability to

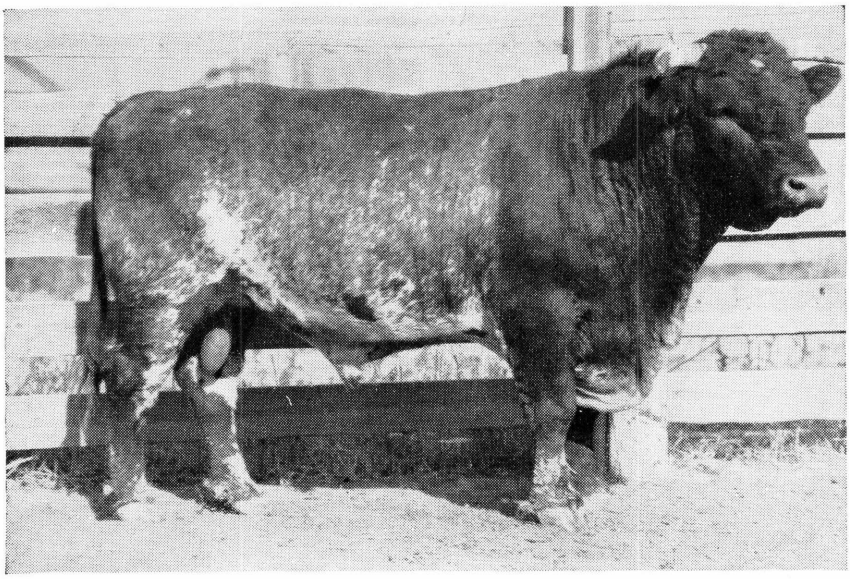

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FIGURE 3.—This bull, although not so attractive as his full brother (fig. 2), sired calves that were heavier at birth, at weaning time, and when slaughtered. His calves were 42 pounds heavier when slaughtered, and the quality of carcass was considerably higher, the return being nearly $5 greater per calf than that for calves sired by his brother.

produce sufficient milk to assist materially in the development of a calf to at least 8 months of age. The milking ability of young stock is, of course, difficult to forecast. Nevertheless, one may observe these qualities in the dams of heifers selected and thereby gain some idea of the milking potentialities of the heifer. Cows that become thin when nursing calves are usually good milkers.

It is generally advisable, before choosing a herd sire, to assemble and study the cow herd as a unit to be in a better position to choose a bull that will mate well with the cows and heifers. So far as possible, it is generally advisable to select females of relatively similar breeding, as a more uniform strain of cattle should result than if cattle are obtained in a haphazard manner.

When cattle from other herds are obtained, they should be isolated from the herd to which they are to be introduced until they are known to be free from disease.

PEDIGREES

Opinions differ in regard to the emphasis that should be given to pedigrees, but generally more should be given to the individuality and performance of an animal than to its pedigree. The pedigree is of value in portraying the immediate ancestry of the animal, the herds from which these ancestors came, and the degree of line breeding or inbreeding employed.

Two general types of pedigree forms are used, illustrations of which follow. The first is the extended form, such as is used by Aberdeen Angus and Hereford breeders, and the second is the abbreviated form, such as is used by Shorthorn breeders. In the extended form of pedigree the sires are listed on the top half of each bracket and the female line on the lower half. In the abbreviated pedigrees the dams are listed on the left, and the sire of the individual and the sires of the dams are on the right. Below these names are the three top sires on the right with two generations of their pedigrees.

GENERAL OF PAGE 452594

Calved: April 22, 1931

Bred and owned by _____
(Name and address)

- Revolution of Page 11th 407252
  - Blackcap Revolution 287269
    - Earl Marshall 183780
    - Blackcap McHenry 104th 149400
  - Eline E. 4th of Page 260346
    - Ensign of Glencarnock 217216
    - Eline E. 2d 155531
- Genevette of Ballindalloch 428990
  - Jorum of Ballindalloch 423476
    - Evilesco of Ballindalloch 423406
    - Bella of Ardargie 311851
  - Geneva of Ballindalloch 428954
    - Evolensign of Ballindalloch 428940
    - Gisela 428953

SULTAN PRINCE 2D 1914193

Roan, calved July 10, 1937. Bred and owned by _____
(Name and address)

Dams	*Breeders of dams got by—*	*Sires*	*Breeders of sires*
Edellyn Rosewood 9th 1580535	Thos. E. Wilson	Sultan Browndale 1771330	Thos. E. Wilson
Winmoor Rosewood 4th	W. H. Schendorf	Browndale Count 1156438	James Douglas
Ravendale Rosewood	John O. Pew & Son	Linwood Rodney 1020043	Carpenter & Ross
Rosewood 93d	Carpenter & Ross	Glaryford Augustus 716421	M. Dysart
Maxwalton Rosewood 6th	Carpenter & Ross	Revolution 388359	Carpenter & Ross
Rosewood 92d	W. D. Morrison	Maxwalton Renown 367543	Carpenter & Ross
Rosewood 76th	J. Bruce	Golden Prince 306267	R. Copland
Rosewood 54th	J. Bruce	Waverley 136405	A. Strachan
Rosewood 23d	J. Bruce	Cap-a-Pie 106717	J. Bruce
Rosewood 13th	J. Bruce	Duke of Edinburgh 130843	J. Bruce
		Privy Seal 109647	A. Cruickshank

Sultan Browndale, Sire, Glenburn Field Marshal 1709714 by Edellyn Favorite 1430250, out of Clipper Countess 2d 1215702; dam, Rookwood Golden Chain 5th 1712052 by Golden Browndale 1498465, out of Golden Lady 13th 1307124.

Browndale Count, sire, Browndale 334947 by Avondale 245144, out of Maxwalton Mina 2d 86601; dam, Morning Blossom 2d 1023473 by Roan Chief 361556, out of Morning Blossom 711477.

Linwood Rodney, sire, Rodney 753273 by Sanquhar Dreadnought 680399, out of Rosetta 7th 753278; dam, Baroness Undine 794380 by Baron's Pride 306627, out of Nonpareil Undine 794391.

In judging a pedigree special consideration should be given to the first three generations. It is the consensus of opinion that the sire and dam have twice as much influence on the individual's genetic make-up as the grandparents, and they in turn each contribute twice as much as their parents in the third generation. The real value of a pedigree, then, is measured by the number of close ancestors that have proved themselves to be outstanding breeding animals.

A breeder generally selects animals to be maintained in the breeding herd according to acceptable type. In addition to establishing standards of type as a requisite for maintaining young animals in the herd, it is well to consider their rate of gain from birth to a year of age or more. Since it is impossible under practical farming conditions to afford an equal opportunity for every calf, the breeder should take into account the performance of calves that did not receive sufficient milk during the nursing period or that were handicapped by some environmental factors.

One method of obtaining desirable uniformity in the herd is to score the females on type, using numerical values such as 1, 2, 3, 4, and 5, and eliminate those animals in the last two classes (4 and 5) so far as possible unless they produced progeny that conformed to the standards established for type and rate of gain. On the other hand, cows scoring high should also be eliminated if they produce inferior progeny. It should be remembered, however, that in the mating of beef cattle some cows produce a more desirable calf of one sex than of the other and more type calves when mated to a certain bull than to another. Furthermore, there are bulls whose offspring include calves of one sex predominantly more desirable in type than those of the other.

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From time to time it will be necessary to dispose of nonbreeders, otherwise unsatisfactory breeders, and cows that have outlived their usefulness, as well as heifers that do not conform to the type level of the herd. Bull calves not suitable for breeding purposes or those that are to be used as show steers should be castrated as early as possible. Heifers unsuitable for breeding purposes, largely because of type, should be sold for beef. Heifers that conform to the desired type and are from good breeding cows should be retained for replacements (fig. 4).

In the selection of heifers, however, consideration should be given to their capacities to consume feed and to their respective weights at 1 year of age. It is well to maintain, up to this age, a somewhat larger group than will be needed for replacement to afford a better

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FIGURE 4.—A group of Hereford heifers retained for breeding purposes. Note the uniformity in type and conformation.

chance for selection than would otherwise be possible. Culling may be done in the fall to obviate the additional expense of maintaining undesirable cattle throughout the winter. In large herds cattle are frequently disposed of in both the fall and spring. It may be advisable to feed grain to animals that are to be marketed in order to put them in desirable market condition.

To avoid closer inbreeding than is generally desirable it becomes necessary after a few years to replace the herd sire. This is frequently a difficult task, particularly when the sire has proved to be very satisfactory. Some herds are of sufficient size to warrant the use of two or more bulls, and in such instances there is the possibility of replacing the senior herd sire with a younger bull that has been tested on a limited number of young cows. However, in small herds it is generally necessary to replace the bull with one from another herd.

MANAGEMENT OF THE BREEDING HERD

BREEDING PRACTICES[3]

Breeding plans followed by various breeders differ somewhat. Line breeding and inbreeding, with occasional outcrossing, are methods commonly used by successful breeders. These practices have been established to produce strains of cattle that breed more uniformly with respect to desired type than would generally occur if promiscuous breeding practices were followed. It is thus advisable for the breeder to follow a rather definite breeding program.

In most cattle-breeding establishments both pasture and hand-breeding methods are employed. Where cows are pasture-bred, the bull is permitted to run with the cows. When hand-breeding methods are practiced, the cows are brought to the bull for service or to a properly equipped stall for artificial insemination. Although the latter method offers promise, it can be employed successfully and with safety only by specially trained persons.[4] It is frequently advisable to breed heifers with the aid of a breeding crate. The crate is helpful when breeding small heifers to a mature bull. Heifers that appear frightened by the presence of the bull should be placed in a breeding crate. When pasture-breeding methods are employed, the herdsman should make daily observations of the herd to keep an accurate record of breeding dates.

Normal cows will breed at regular intervals throughout the year, although heat periods are most pronounced during the spring and summer. The cycle of heat, or estrum, ranges from 18 to 21 days and, as a rule, lasts 12 to 24 hours. There are several indications of the presence of the period of estrum, such as nervousness and the mounting of and being mounted by other animals. Ordinarily, cows that are to be bred should be served at the first sign of the heat period, as it may have begun before it is first observed. Moreover, some cows are in heat for only a relatively short time. Cows come in heat 3 to 7 weeks after calving but are not usually bred until the occurrence of the second or third period after the birth of the calf, which is in about 2½ to 3 months.

The cessation of periods of heat after a cow has been bred is a good indication that she is safely in calf. This is not absolute proof as many cows occasionally pass over a period. On the other hand, some cows will stand for service when in calf. Pregnant cows become more quiet and docile and put on weight as the gestation period progresses. In 5 to 6 months after being bred, the pregnant cow begins to show a fullness in the region of the abdomen. The gestation period of beef cattle is approximately 283 days, or about 9½ months (table 1).

[3] A detailed discussion of breeding principles is contained in Farmers' Bulletin 1167, Essentials of Animal Breeding. Out of print. May be consulted in libraries.

[4] A detailed discussion of artificial insemination is contained in Circular 567, Artificial Insemination in Livestock Breeding.

TABLE 1.—*Gestation table for cows (283 days)*

Day of month bred	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Explanation: Find date cow was bred in first column and month bred in top line. The date in column below opposite date bred will be the time at which the cow is due to calve											
1	Oct. 11	Nov. 11	Dec. 9	Jan. 9	Feb. 8	Mar. 11	Apr. 10	May 11	June 11	July 11	Aug. 11	Sept. 10
2	12	12	10	10	9	12	11	12	12	12	12	11
3	13	13	11	11	10	13	12	13	13	13	13	12
4	14	14	12	12	11	14	13	14	14	14	14	13
5	15	15	13	13	12	15	14	15	15	15	15	14
6	16	16	14	14	13	16	15	16	16	16	16	15
7	17	17	15	15	14	17	16	17	17	17	17	16
8	18	18	16	16	15	18	17	18	18	18	18	17
9	19	19	17	17	16	19	18	19	19	19	19	18
10	20	20	18	18	17	20	19	20	20	20	20	19
11	21	21	19	19	18	21	20	21	21	21	21	20
12	22	22	20	20	19	22	21	22	22	22	22	21
13	23	23	21	21	20	23	22	23	23	23	23	22
14	24	24	22	22	21	24	23	24	24	24	24	23
15	25	25	23	23	22	25	24	25	25	25	25	24
16	26	26	24	24	23	26	25	26	26	26	26	25
17	27	27	25	25	24	27	26	27	27	27	27	26
18	28	28	26	26	25	28	27	28	28	28	28	27
19	29	29	27	27	26	29	28	29	29	29	29	28
20	30	30	28	28	27	30	29	30	30	30	30	29
21	31	Dec. 1	29	29	28	31	30	31	July 1	31	31	30
22	Nov. 1	2	30	30	Mar. 1	Apr. 1	May 1	June 1	2	Aug. 1	Sept. 1	Oct. 1
23	2	3	31	31	2	2	2	2	3	2	2	2
24	3	4	Jan. 1	Feb. 1	3	3	3	3	4	3	3	3
25	4	5	2	2	4	4	4	4	5	4	4	4
26	5	6	3	3	5	5	5	5	6	5	5	5
27	6	7	4	4	6	6	6	6	7	6	6	6
28	7	8	5	5	7	7	7	7	8	7	7	7
29	8	.....	6	6	8	8	8	8	9	8	8	8
30	9	.....	7	7	9	9	9	9	10	9	9	9
31	10	.....	8	.....	10	.....	10	10	.....	10	.....	10

NUMBER OF COWS PER BULL

Bull calves should not be put in service until they are at least 14 months of age and then only on a limited number of young cows. The number of cows that a 2-year-old or a mature bull can usually serve satisfactorily depends on the method of breeding that is practiced. If the bull is kept in a pen and the cows are brought to him for service, 20 to 25 cows may be allotted to a well-grown 2-year-old bull and twice that number to a mature bull. The latter should not be allowed more than 25 cows when he is kept with the cows under range conditions.

Normally heifers reach puberty at 8 to 12 months of age. However, it is not advisable to breed them until they are at least 18 months old.

BREEDING SEASONS

Although considerable numbers of calves are dropped in the summer and fall, many breeders, particularly those in the range areas, prefer to breed their cows for spring calving. Calves dropped during this season have the advantage of favorable climatic and environmental conditions and obtain more milk than fall calves, provided their dams are grazing succulent pastures with ample quantities of grass. Moreover, spring calves may be sold at weaning age and expense for wintering thus be avoided, or they may be held over one wintering period and sold the following spring or fall. On the other hand, fall calves are not so severely subjected to warm weather, flies and other insects and may be given closer attention during a critical period of their lives.

Unless cattle are to be exhibited at stock shows, it is well to confine the breeding season to about 3 months of the year in order to have a fairly uniform calf crop with respect to size and age. If cattle are to be shown at fairs, three breeding seasons will be necessary under the present classifications to have available junior and senior calves and summer yearlings. Calves born from January 1 to April 30 of the current year are classified as junior calves. Senior calves are those born between September 1 and December 31 of the previous year, whereas those born from May 1 to August 31 of the previous year are summer yearlings. All breeding classes at the shows are classified by age, whereas the steer classes may be designated by either age or weight.

CARE OF COW AND CALF DURING PARTURITION

Cows calving late in the spring and in the summer on good pasture seldom need assistance during parturition. However, it is advisable for the herdsman to be on hand at the time of parturition, particularly in the case of heifers and cows whose gestation period has been unusually long. Since many cows give considerably more milk than the calf can consume during the early stages of its life, it may be necessary for the herdsman to milk the cow daily until the calf is large enough to consume all its mother's milk.

In the winter and early in the spring, particularly during cold and stormy weather, a cow or heifer due to calve within a few days should be comfortably housed in a stall by itself but preferably near other cattle. Generally speaking, little change should be made in the animal's ration. Immediately after parturition it is desirable to allow the cow lukewarm water, followed in a few hours with a small quantity of oats, wheat bran, and legume hay.

If a cow has not calved within 4 or 5 hours after the onset of labor, it is advisable to make an examination. The herdsman who has had considerable experience with cattle can usually render any aid that is necessary. However, in some instances it may be necessary to call a veterinarian. If the calf seems lifeless or very weak at birth, the attendant should examine the nostrils and mouth and remove any mucus that may be obstructing normal breathing. Blowing air into the mouth and nostrils after removing the mucus may aid in reviving the calf. Small and weak calves should be assisted in nursing through the first day after birth. If calves are born dead and it is definitely known that the cause is not suffocation, it is desirable to have them examined thoroughly by a veterinarian.

DEVELOPMENT OF YOUNG STOCK

CALVES TO WEANING AGE

Occasionally a cow or heifer will not give sufficient milk to nourish a very young calf properly, in which event it becomes necessary to obtain milk from another cow. However, unless the other cow gives more than enough milk for her own calf, this procedure is undesirable, as it obviously limits the milk supply for the two calves. Some breeders keep nurse cows for such purposes. Another method is to feed the calf whole milk at the rate of about 1 pound of milk for every 10 pounds of calf weight until the animal is 2 weeks old and then

gradually reduce the quantity of whole milk at the rate of about 1 pound per day and replace the milk with grain and supplements.

Generally calves begin to eat grain when they are 4 to 5 weeks old. At this time they should be given about one-half pound of grain per head per day of a mixture such as equal parts, by weight, of shelled corn and whole oats. A more complete suitable feed mixture for a young calf may be made up of 30 parts, by weight, of ground barley or yellow corn, 25 parts of ground oats, 25 parts of wheat bran, 8 parts of linseed meal, 9 parts of dried skim milk, 2 parts of salt, and 1 part of steamed bonemeal. The ration should be increased gradually as the calves grow older. After the calves are 3 months old, a mixture containing 4 parts, by weight, of cracked corn, 3 parts of ground oats, 2 parts of wheat bran, and 1 part of linseed meal is usually satisfactory. Calves on pasture with their dams may be fed the grain mixture in a

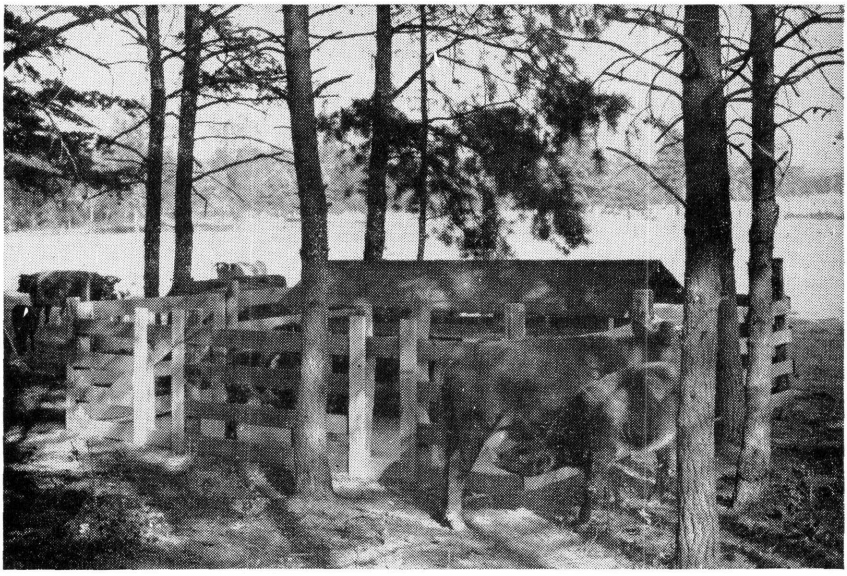

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FIGURE 5.—By the use of a creep, grain may be fed to nursing calves while on pasture with their dams. The openings in the surrounding fence are of sufficient size to permit only the calves to enter.

shaded creep located near water and salt supplies (fig. 5). Calves fed grain prior to weaning are usually significantly heavier than similar calves receiving no grain. Furthermore, the grain-fed calves have less set-back when weaned. Calves not on pasture should have access to legume or mixed hay of good quality when they are about 3 weeks old. Grain should be fed twice a day at regular intervals, and the calves may be permitted to nurse three times a day until they are consuming considerable grain and hay. After the noon nursing it is advisable to turn the calves into paddocks with their dams for 2 or 3 hours when the weather permits.

The bull calves should be separated from the heifers when they are 6 or 7 months old. Generally, calves not being fitted for show purposes are weaned at 7 to 9 months of age, depending largely on the

quantity of milk they are still receiving from their dams and the condition of the calves.

YOUNG BULLS

For proper development of young bulls liberal feeding is necessary. A grain mixture such as 5 parts, by weight, of cracked or coarsely ground corn, 3 parts of crushed oats, 2 parts of wheat bran, and 1 part of linseed meal, with legume or mixed hay and silage, should serve this purpose. If the bulls have access to good pasture, little or no legume hay will be necessary. The grain should be fed twice a day and in quantities not exceeding 1½ pounds per 100 pounds of live weight. The feeding of silage should be limited to about 1 pound per 100 pounds of live weight. When silage is fed, it may be placed with the grain in the feed bunk or box.

So far as possible it is desirable to house young bulls in a barn that can be connected with lots or small pastures to provide space for exercise. It is best to separate them according to ages and feed them in groups as they tend to eat better and take more exercise than if they are individually fed. Frequent haltering, leading, and brushing tend to make bulls more docile and less difficult to handle. Prospective buyers looking for young breeding bulls generally prefer animals that are in good condition and easily managed.

HEIFERS

It is especially desirable to feed heifers that are maintained for breeding purposes in a manner to insure proper development and a strong, vigorous condition, and yet be economical. Feeding these animals some grain until they are 18 to 20 months old is generally advisable. Yearling females on pasture will make satisfactory gains on 3 or 4 pounds of grain per head daily. When pastures are short or dry the addition of 10 or 15 pounds of silage is desirable. A grain mixture similar to that suggested for growing bulls is satisfactory.

During winter months hay, straw, and silage should form the roughage portion of the ration. A grain ration composed of 5 pounds of legume or mixed hay, 20 pounds of corn silage, and 5 pounds of grain, or one containing 8 pounds of legume hay, 5 of straw, 12 of corn silage, and 5 of grain should keep a 750- to 1,000-pound heifer in thrifty condition. If the silage is of good quality and contains considerable grain, a ration composed of 25 pounds of silage, 6 pounds of mixed hay, and 1 pound of any of the protein concentrates should be satisfactory. When straw is fed in the absence of legume hay during the winter months, it should be supplemented with a protein concentrate such as soybean, peanut, linseed, or cottonseed meal.

Heifers that are not suitable to keep in the herd should be placed in fattening pens and prepared for market rather than sold to breeders.[5]

CARE OF BREEDING COWS

After the cows are turned on pasture in the spring little labor is required for their care other than daily observation of the herd to see that they are receiving sufficient water and to locate cows in heat and those due to calve.

[5] The feeding of beef cattle for market is discussed at considerable length in Farmers' Bulletin 1549, Feeding Cattle for Beef.

If beef cattle are grazing highly improved pastures (fig. 6) salt is generally the only form of mineral supplement needed. Native pasture grasses in certain areas, particularly in the South, are frequently deficient in phosphorus, and this may be supplied in the form of steamed bonemeal or cottonseed cake. Many producers keep a mixture composed of equal parts, by weight, of common salt and bonemeal before the cattle at all times.

So far as possible the females should be divided into age groups—the cows in one group and the heifers in another. This procedure will be necessary if the yearling heifers are to be given grain on pasture.

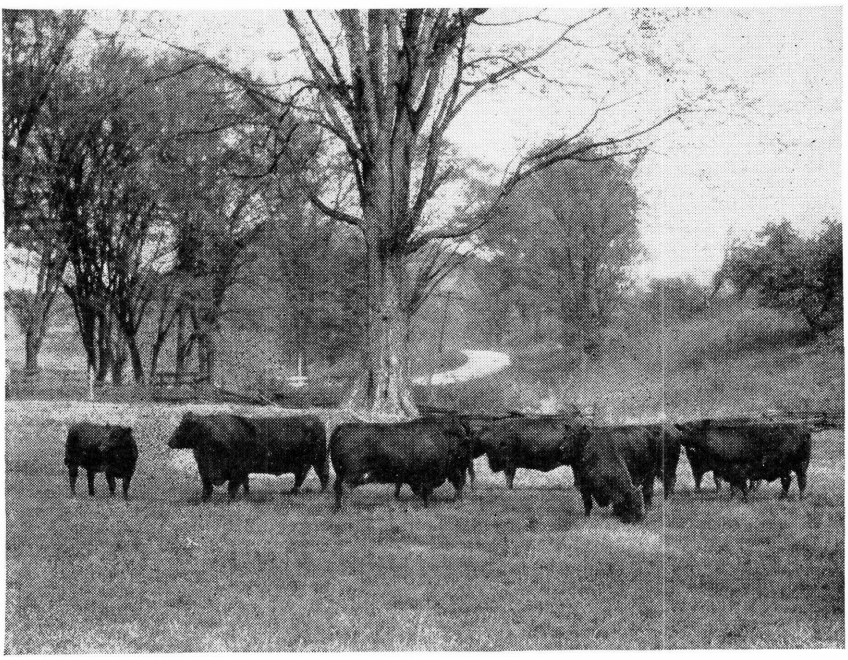

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FIGURE 6.—Aberdeen Angus breeding herd on summer pasture. Note that the grass has not been allowed to get beyond a good grazing stage of growth. The value of a pasture is enhanced by shade trees well distributed.

Furthermore, it results in a more uniform-appearing group. The cows should be left on pasture late in the summer or in the fall until inclement weather sets in, unless it is desirable to give extra attention to their calves. If pastures are sparse, it is advisable to feed some form of supplement, such as legume or mixed hay placed in racks or small quantities of concentrates.

During the winter all females not nursing calves should be kept out of doors, provided they have access to a well-constructed open shed (fig. 7) having an exposure opposite to the direction of prevailing storms. However, it is advisable to group the animals by age when practicable. There will be material saving of both feed and bedding if the hay racks and grain bunks are built against the inside wall of the shed.[6] The amount of space necessary for each animal varies

[6] Suitable sheds and other equipment for beef cattle are illustrated and discussed in Farmers' Bulletin 1584, Feed-Lot and Ranch Equipment for Beef Cattle.

with the size of the animal but should generally range from 30 to 40 square feet. Cattle need exercise, particularly during winter months. Therefore, they should have access to open lots or fields where they may move about and graze at will. It is a good plan to feed fodder in pastures that need fertilizer so that both cattle and pastures will be benefited.

Succulent feeds, such as silage or root crops, are essential for cows not on pasture, although legume or mixed hay and straw or stover may form a portion of the ration. However, when the two latter rough-

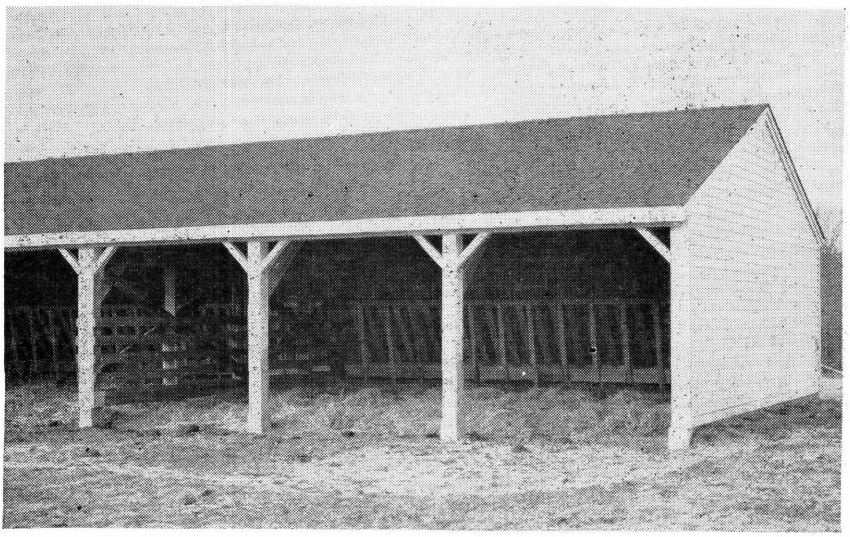

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FIGURE 7.—Open shed with feed bunks built along the inside wall. Such protection and arrangement save both feed and bedding.

ages are fed in appreciable quantities some protein concentrate will be needed to provide a suitable ration.

For wintering dry, pregnant cows one of the following rations is suggested:

RATION NO. 1

Kind of feed	*Pounds*
Corn or sorgo silage	35
Legume hay	6

RATION NO. 2

Corn fodder	15
Mixed hay	10
Straw	2

RATION NO. 3

Soybean or sorghum silage	35
Straw or cottonseed hulls	10
Cottonseed meal [1]	1½

RATION NO. 4

Kind of feed	*Pounds*
Corn silage	35
Mixed hay	10
Cottonseed meal [1]	1

RATION NO. 5

Corn silage	25
Soybean hay	7
Wheat straw	3

RATION NO. 6

Clover or alfalfa hay	15
Straw	10
Cottonseed cake [1]	1

[1] Linseed meal, soybean meal, or similar concentrates may be fed in the same proportions if more readily available.

During the winter months it may be desirable to feed thin-fleshed cows about 3 to 4 pounds of grain per animal, but ordinarily there is no need to feed grain to mature pregnant cows in thrifty condition.

Cows nursing calves through the winter will need about 35 pounds of corn or sorgo silage, 10 pounds of legume or mixed hay of good quality, and about 5 pounds of a grain mixture, such as 3 parts, by weight, of corn-and-cob meal and 1 part each of wheat bran and cottonseed meal per head daily in order to keep them in a thrifty condition and stimulate the milk flow. However, the quantities of feed required naturally vary with the size and condition of the animals. The silage and grain may be fed in the barn and the hay fed in racks or bunks placed outdoors.

CARE OF THE HERD BULL

There are various ways of managing herd bulls, depending largely on the breeding program. As previously stated, some breeders permit the bull to run with the cows during the breeding seasons, and others keep the bull separate from the herd and bring the cows to him for service. The common practice is to winter the herd bulls in sheds or feed lots and to feed them liberally on grain, protein concentrates, and roughage. It is essential to have the bull in a thrifty condition at the beginning of the breeding season, which in the Northern States is usually about July 1, unless cattle are to be exhibited at fairs. However, bulls liberally fed during the winter are likely to become too fat if not allowed to get considerable exercise.

Winter range is desirable for a bull if it is provided with shelter and conveniently located so that he may be given supplemental feed each day. Grain at the rate of ½ to 1 pound per 100 pounds of live weight with good range should be sufficient if the animal has entered the winter in a thrifty condition. If range is not available, a good-quality legume hay should be fed at the rate of approximately 1½ to 2 pounds daily per 100 pounds of live weight or half this quantity with about 1 pound of silage per 100 pounds of live weight.

EXERCISE

Exercise is necessary for the proper physical development of all classes of beef cattle. Normally cows and calves get sufficient exercise, as during the summer the cows run on pasture, and during the winter in many localities they are allowed winter range with access to open sheds and supplementary feed. If calves are kept in barns and not allowed to run with their dams, they should have access to paddocks.

If the bull is not running with the cow herd he should have access to a paddock or small pasture. During the winter, if the bull is placed with pregnant cows or permitted to run with the open cows for a few hours each day, he will usually get sufficient exercise.

Generally, in the summer, show cattle are kept in dark cool barns or sheds during the day and turned out in small lots in the evening for exercise. Properly exercised cattle will not often be troubled with lameness or stiffness.

SELECTING CALVES FOR SHOW [7] OR FOR THE BREEDING HERD

In selecting calves for show purposes or for a breeding herd, primary consideration should be given to their general type and conformation. Deep, wide-bodied, blocky calves with strong level backs, long level rumps, deep full thighs, and short relatively straight legs are considered most desirable. Breeders are also desirous of selecting calves that are smooth and that possess a reasonable degree of natural fleshing evenly distributed. Calves selected for the breeding herd should conform to the accepted color markings of the breed they represent.

It is important also to bear in mind the breeding ability and conformation of the sire and dam of a calf and the outcome of previous matings, if there were any. Calves that give indication of developing into desirable show animals should be placed in the feeding barn when from 3 to 5 months old. If, on the other hand, a person is contemplating the purchase of one or more calves, it is advisable to examine available prospects while they are still nursing their dams in order to become acquainted with the development of the calf under the conditions in which it has been placed. Obviously, few calves are afforded the same opportunity for development even on the same farm. Some calves look thrifty mainly because they have had an excellent opportunity to develop. Other calves, with greater potentialities in the breeding herd, may be less attractive because they have not been given an adequate opportunity to demonstrate their maximum ability.

Unless the prospective purchaser has milk available for feeding, it is not desirable to obtain a calf until it has been weaned. Calves that do not receive a sufficient quantity of milk from their dams or other sources do not make maximum growth. Some show calves are chosen from groups of feeders, in which event the selector must necessarily base his decision on type, conformation, and apparent thriftiness.

GENERAL SUGGESTIONS

When cattle are registered with the respective breed associations some form of identification is necessary to establish accurate records. Some registry associations require tattoo identification on the inside of the ears, which is one of the most permanent means of identification. With breeds having pigmented skins, such as the Aberdeen Angus, tattoo marks are somewhat difficult to read. Neck chains with numbers are generally used with the polled breeds. Eartags are used by many breeders, but they are not a fully dependable means of identification as tags are sometimes torn out. All cattle in the herd should have some form of identification, and this should be carefully recorded.

The herdsman should have two breeding books—one of pocket size for his daily use and a larger office book in which to record duplicate accounts of all breeding and calving dates. It is also a good plan to make notes of irregularities in breeding and calving, unduly short or

[7] Preparing cattle for show or sale is fully discussed and illustrated in Farmers' Bulletin 1135, The Beef Calf—Its Growth and Development

long gestation periods, physical abnormalities, and undesirable color markings of calves dropped.

Cost of production per animal is usually higher in herds kept for the production of breeding cattle than in those kept strictly for feeder or fat-cattle production, owing largely to the greater investment per head, the greater amount of labor required, and the more expensive equipment used. Adequate equipment,[8] such as barns and sheds, is necessary, but it need not be elaborate. Sheds will suffice for almost all classes of beef cattle, with the possible exception of cows at calving time during inclement weather. In areas where considerable quantities of silage can be produced, it is advisable to have one or more silos, depending on the number of cattle being fed and the capacity of the silo.[9]

To show animals to best advantage to prospective buyers, the breeder of purebreds should keep the herd in a somewhat higher condition and develop the young stock to a greater degree than would be necessary in a grade herd. A larger financial outlay in the form of feed and labor will be necessary to accomplish this.

Without an established market for breeding cattle it is advisable for the breeder to advertise his cattle in breed journals and newspapers and by the use of letterheads or by showing at fairs. From time to time it may be desirable to place cattle in consignment sales or have a private sale if there are enough cattle of good quality to warrant it.

Percentage of calf crop, number of calves raised, and death losses have a more direct bearing on production costs than almost any other combination of production factors. The cattle breeder should, therefore, keep nonbreeders out of the herd, maintain his cattle at the proper nutrition level, and have sufficient bulls to serve the herd adequately in order to obtain a high percentage calf crop.

Select herd replacements on the basis of type, quality, size, growth ability, disposition, milk production of dams, and milk production of dams of sires.

The herd should be maintained under sanitary conditions and tested periodically for tuberculosis and brucellosis (Bang's disease) in accordance with State and Federal regulations. In many areas it is necessary to vaccinate young stock against such diseases as blackleg. Introducing diseases into the herd through failing to take the proper precautions when additions to the herd are made and failing to keep the herd in a healthy condition through proper nutrition and sanitary conditions will materially lessen the income. Attention to such matters often determines whether the enterprise is a success or failure.

[8] A discussion of the equipment necessary in the production of beef cattle is contained in Farmers' Bulletin 1584, Feed-Lot and Ranch Equipment for Beef Cattle.

[9] A discussion of silos and their construction is contained in Farmers' Bulletin 1820, Silo Types and Construction.

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